REMARKS

1. In paragraph 2 of the Official Action, the Examiner notes that the Oath/Declaration is defective because the foreign application filing date is in error. A replacement Oath/Declaration with this correction will be forwarded shortly.

2. In response to paragraph 3 of the Official Action, the Applicants have amended the Abstract. The Applicants submit that the amended Abstract is now in the proper language and format and request that this objection be withdrawn.

3. In response to paragraphs 4(a) to (d) of the Official Action, the Applicants have amended the specification as suggested by the Examiner.

4. In response to paragraph 4(f) of the Official Action, the Applicants enclose a copy of the two page document referred to in the specification as "Anoto Technology Description", Anoto April 2000. Although this document is undated, the Applicants confirm that this is the document in question.

5. In response to paragraph 5 of the Official Action, the Applicants enclose a copy of page 394 of "Intelligent Paper; in Electronic Publishing, Artistic Imaging, and Digital Typography", Dymetman, M. and Copperman, M., Proceedings of EP '98, March/April 1998, Springer Verlag LNCS 1375, pp. 392-406.

6. The Examiner has suggested in paragraph 8 of the Detailed Action that claims 1-10 are obvious over Conroy et al (US 5,686,705) in view of Dymetman et al ("Intelligent Paper; in Electronic Publishing, Artistic Imaging, and Digital Typography"). She suggests that it would have been obvious *"to utilize Dymetman et al's map printed on intelligent paper with coded data with Conroy et al's position locating method because it would provide an interactive map information exchange wherein a user would be able to perform similar function on a printed map as he would on screen."*

7. In response, the Applicants have sought to amend the claims on file to more clearly distinguish the claimed invention from the inventions disclosed in Conroy and Dymetman.

The Applicants submit that the invention claimed in claim 1 differs from Conroy in view of Dymetman because neither of those citations disclose a system or method in which the *"map of the geographic area and the coded data [are] printed substantially simultaneously."*

The Applicants submit that none of the citations disclose simultaneous printing of the map of the geographic area and the coded data.

Dymetman explicitly teaches away from simultaneously printing and teaches separate printing of coded sheets which are then supplied to a publisher (see col. 11, lines 46 to 65 of Dymetman et al's US Patent 6,330,976).

Further, the Examiner has noted that Conroy *"fails to specifically disclose printing a map, including coded data."*

The Applicants submit that neither the Dymetman nor the Conroy citations disclose a system or method in which the *"map of the geographic area and the coded data [are] printed substantially simultaneously."*

The comments made above regarding simultaneous printing in relation to amended claim 1 apply equally to amended claim 6.

For these reasons the Applicants submit that amended claims 1 and 6 are inventive in light of Conroy and Dymetman and request that the Examiner reconsider her obviousness objection.

8. Since amended claims 1 and 6 are inventive, the Applicants further submit that subsidiary claims 2 to 5 and 7 to 10 are also inventive in light of the cited prior art.

9. The Examiner has rejected claims 11 and 12 as being anticipated by Conroy et al (US 5,686,705). In response, the Applicant has sought to amend claims 11 and 12 to more clearly distinguish the claimed invention from the invention disclosed in Conroy. The Applicant submits that the invention claimed in claim 11 differs from Conroy for at least the following reasons:

The Conroy system is an electrographic sensor and works via the interaction of a stylus with an active, conducting sphere containing intricate electronics. When the stylus comes into

contact with the conducting sphere, the sphere senses the position of the stylus on the surface of the sphere. The electronics inside the sphere then determine the coordinates of the selected location. See col. 18, lines 18-38. In this way, the sphere, and the electronics inside the sphere, play an active role in identifying the position of the stylus.

In contrast, the globe of the present invention is "*a non-electronic printed surface displaying coded data indicative of a plurality of reference points of the globe.*" The claimed globe does not contain electronics and does not sense the presence or absence of the "*sensing device*" on its surface. Instead, it is the "*sensing device*" which generates "*the indicating data based at least partially on sensing at least some of the coded data*" and sends the "*indicating data*" to the computer system. In the claimed invention, therefore, the sensing device is the active device and the globe surface is passive, merely containing the "*coded data indicative of a plurality of reference points of the globe.*"

Since Conroy does not disclose a globe surface which is "*a non-electronic printed surface displaying coded data indicative of a plurality of reference points of the globe*" the Applicants submit that claim 11 is not anticipated by Conroy. Consequently, dependent claim 12 is also not anticipated by Conroy.

The Applicants request that the Examiner reconsider her novelty objections in light of these amendments and arguments.

CONCLUSION

It is respectfully submitted that all of the Examiner's objections have been successfully traversed. Accordingly, it is submitted that the application is now in condition for allowance. Reconsideration and allowance of the application is courteously solicited.

Very respectfully,

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VERSION WITH MARKINGS

Section beginning on page 1, line 6 to page 2, line 20 has been amended as follows:

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on October 20, 2000 [simultaneously with the present invention]:

09/693,415 (NPA011US), 09/693,219 (NPA031US), 09/693,280 (NPA040US),
09/693,515 (NPA046US), 09/693,705 (NPA053US), 09/693,647 (NPA059US),
09/693,690 (NPA064US), 09/693,593 (NPB006US), 09/693,216 (NPS004US),
09/693,341 (NPS008US), 09/696,473 (NPS013US) 09/696,514 (NPS024US),
09/693,301 (NPPC1), 09/693,388 (UP01US), 09/693,704 (UP02US),
09/693,510 (UP03US), 09/693,336 (UP04US), 09/693,335 (UP05US)

The disclosures of these co-pending applications are incorporated herein by [cross-]reference. [Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.]

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on September 15, 2000:

09/663,579 (NPA024US), 09/669,599 (NPA025US), 09/663,701 (NPA047US),
09/663,640 (NPA049US),

The disclosures of these co-pending applications are incorporated herein by [cross-]reference. [Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.]

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on June 30, 2000:

09/609,139 (NPA014US), 09/608,970 (NPA015US), 09/609,039 (NPA022US),
09/607,852 (NPA026US), 09/607,656 (NPA038US), 09/609,132 (NPA041US),
09/609,303 (NPA050US), 09/610,095 (NPA051US), 09/609,596 (NPA052US),
09/607,843 (NPA063US), 09/607,605 (NPA065US), 09/608,178 (NPA067US),
09/609,553 (NPA068US), 09/609,233 (NPA069US), 09/609,149 (NPA071US),
09/608,022 (NPA072US), 09/609,232 (NPB003US), 09/607,844 (NPB004US),
09/607,657 (NPB005US), 09/608,920 (NPP019US), 09/607,985 (PEC04US),

09/607,990 (PEC05US), 09/607,196 (PEC06US), 09/606,999 (PEC07US)

The disclosures of these co-pending applications are incorporated herein by [cross-]reference. [Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.]

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 23 May 2000:

09/575,197 (NPA001US), 09/575,195 (NPA002US), 09/575,159 (NPA004US),
09/575,132 (NPA005US), 09/575,123 (NPA006US), 09/575,148 (NPA007US),
09/575,130 (NPA008US), 09/575,165 (NPA009US), 09/575,153 (NPA010US),
09/575,118 (NPA012US), 09/575,131 (NPA016US), 09/575,116 (NPA017US)
09/575,144 (NPA018US), 09/575,139 (NPA019US), 09/575,186 (NPA020US),
09/575,185 (NPA021US), 09/575,191 (NPA030US), 09/575,145 (NPA035US),
09/575,192 (NPA048US), 09/575,181 (NPA075US), 09/575,193 (NPB001US),
09/575,156 (NPB002US), 09/575,183 (NPK002US), 09/575,160 (NPK003US),
09/575,150 (NPK004US), 09/575,169 (NPK005US), 09/575,184 (NPM001US),
09/575,128 (NPM002US), 09/575,180 (NPM003US), 09/575,149 (NPM004US),
09/575,179 (NPN001US), 09/575,133 (NPP005US), 09/575,143 (NPP006US),
09/575,187 (NPP001US), 09/575,155 (NPP003US), 09/575,196 (NPP007US),
09/575,198 (NPP008US), 09/575178 (NPP016US), 09/575,164 (NPP017US),
09/575,146 (NPP018US), 09/575,174 (NPS001US), 09/575,163 (NPS003US),
09/575,168 (NPS020US), 09/575,154 (NPT001US), 09/575,129 (NPT002US),
09/575,124 (NPT003US), 09/575,188 (NPT004US), 09/575,189 (NPX001US),
09/575,162 (NPX003US), 09/575,172 (NPX008US), 09/575,170 (NPX011US),
09/575,171 (NPX014US), 09/575,161 (NPX016US), 09/575,141 (IJ52US),
09/575,125 (IJM52US), 09/575,142 (MJ10US), 09/575,140 (MJ11US),
09/575,190 (MJ12US), 09/575,138 (MJ13US), 09/575,126 (MJ14US),
09/575,127 (MJ15US), 09/575,158 (MJ34US), 09/575,117 (MJ47US),
09/575,147 (MJ58US), 09/575,152 (MJ62US), 09/575,176 (MJ63US),
09/575,115 (PAK04US), 09/575,114 (PAK05US), 09/575,113 (PAK06US),
09/575112 (PAK07US), 09/575,111 (PAK08US), 09/575,108 (PEC01US),
09/575,109 (PEC02US), 09/575,110 (PEC03US)

The disclosures of these co-pending applications are incorporated herein by [cross-]reference. [Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.]

The paragraph on page 7, lines 5 to 6, has been amended as follows:

Figure 1 is a schematic of a [the] relationship between a sample printed netpage and its online page description;

Paragraph on page 9, lines 3 to 13 has been amended as follows:

In the preferred embodiment, the invention is configured to work with the netpage networked computer system, a summary of which is given below and a detailed description of which is given in our earlier applications, including in particular applications USSN 09/575,129 (docket no. NPT002US), USSN 09/575,174 (docket no. NPS001US), USSN 09/575,155 (docket no. NPP003US), USSN 09/575,195 (docket no. NPA002US) and USSN 09/575,141 (docket no. IJ52US). It will be appreciated that not every implementation will necessarily embody all or even most of the specific details and extensions described in these applications in relation to the basic system. However, the system is described in its most complete form to assist in understanding the context in which the preferred embodiments and aspects of the present invention operate.

The section on page 10, lines 18 to 31 has been amended as follows:

As illustrated in Figure 2, the netpage pen 101, a preferred form of which is described in our earlier application USSN 09/575,174 (docket no. NPS001US), works in conjunction with a netpage printer 601, an Internet-connected printing appliance for home, office or mobile use. The pen is wireless and communicates securely with the netpage printer via a short-range radio link 9.

The netpage printer 601, preferred forms of which are described in our earlier application USSN 09/575,155 (docket no. NPP003US) and our co-filed application USSN 09/693,514 (docket no. NPS024US), is able to deliver, periodically or on demand, personalized newspapers, magazines, catalogs, brochures and other publications, all printed at high quality as interactive netpages. Unlike a personal computer, the netpage printer is an appliance which can be, for example, wall-mounted adjacent to an area where the morning news is first consumed, such as in a user's kitchen, near a breakfast table, or near the household's point of departure for the day. It also comes in tabletop, desktop, portable and

miniature versions.

The paragraph on page 11, lines 10 to 17 has been amended as follows:

The netpage system is made considerably more convenient in the preferred embodiment by being used in conjunction with high-speed microelectromechanical system (MEMS) based inkjet (Memjet™) printers, for example as described in our earlier application USSN 09/575,141 (docket no. IJ52US). In the preferred form of this technology, relatively high-speed and high-quality printing is made more affordable to consumers. In its preferred form, a netpage publication has the physical characteristics of a traditional newsmagazine, such as a set of letter-size glossy pages printed in full color on both sides, bound together for easy navigation and comfortable handling.

The paragraph on page 15, lines 1 to 12 has been amended as follows:

Each tag [contains] typically contains 16 bits of tag ID, at least 90 bits of region ID, and a number of flag bits. Assuming a maximum tag density of 64 per square inch, a 16-bit tag ID supports a region size of up to 1024 square inches. Larger regions can be mapped continuously without increasing the tag ID precision simply by using abutting regions and maps. The distinction between a region ID and a tag ID is mostly one of convenience. For most purposes the concatenation of the two can be considered as a globally unique tag ID. Conversely, it may also be convenient to introduce structure into the tag ID, for example to define the x and y coordinates of the tag. A 90-bit region ID allows 2^{90} ($\sim 10^{27}$ or a thousand trillion trillion) different regions to be uniquely identified. Tags may also contain type information, and a region may be tagged with a mixture of tag types. For example, a region may be tagged with one set of tags encoding x coordinates and another set, interleaved with the first, encoding y coordinates.

The paragraph on page 15, line 28 to page 16, line 11 has been amended as follows:

One embodiment of the physical representation of the tag, shown in Figure 4a and described in our earlier application USSN 09/575,129 (docket no. NPT002US), includes fixed target structures 15, 16, 17 and variable data areas 18. The fixed target structures allow a sensing device such as the netpage pen to detect the tag and infer its three-dimensional orientation relative to the sensor. The data areas contain representations of the individual bits of the encoded tag data. To maximise its size, each data bit is represented by a radial wedge in the form of an area bounded by two radial lines and two concentric circular arcs. Each wedge has a minimum dimension of 8 dots at 1600 dpi and is designed so that its base

(its inner arc), is at least equal to this minimum dimension. The height of the wedge in the radial direction is always equal to the minimum dimension. Each 4-bit data symbol is represented by an array of 2×2 wedges. The fifteen 4-bit data symbols of each of the six codewords are allocated to the four concentric symbol rings 18a to 18d in interleaved fashion. Symbols are allocated alternately in circular progression around the tag. The interleaving is designed to maximise the average spatial distance between any two symbols of the same codeword.

The paragraph on page 16, line 24 to page 17, line 1 has been amended as follows:

An alternative tag structure more suited to a regular tiling is shown in Figure 5a. The tag 4 is square and has four perspective targets 17. It is similar in structure to tags described by Bennett et al. in US Patent 5,051,7[4]36. The tag represents sixty 4-bit Reed-Solomon symbols 47, for a total of 240 bits. The tag represents each one bit as a dot 48, and each zero bit by the absence of the corresponding dot. The perspective targets are designed to be shared between adjacent tags, as shown in Figures 5b and 5c. Figure 5b shows a square tiling of 16 tags and the corresponding minimum field of view 193, which must span the diagonals of two tags. Figure 5c shows a square tiling of nine tags, containing all one bits for illustration purposes.

The paragraph on page 19, lines 2 to 12 has been amended as follows:

An object-indicating (or function-indicating) tag contains a tag ID which directly identifies a user interface element in the page description associated with the region (or equivalently, a function). All the tags in the zone of the user interface element identify the user interface element, making them all identical and therefore indistinguishable. Object-indicating tags do not, therefore, support the capture of an absolute pen path. They do, however, support the capture of a relative pen path. So long as the position sampling frequency exceeds twice the encountered tag frequency, the displacement from one sampled pen position to the next within a stroke can be unambiguously determined. As an alternative, the netpage pen 101 can contain a pair or motion-sensing accelerometers, as described in our earlier application USSN 09/575,174 (docket no. NPS001US).

The paragraph on page 21, lines 16 and 17 has been amended as follows:

Our earlier application USSN 09/575,129 (docket no. NPT002US) describes in detail the tagging of the surface of a sphere.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIMS

1. A method of enabling a user to designate, in a computer system, at least one geographic location, the method including the steps of:

printing a map of a geographic area, the geographic area including the at least one geographic location, the map including coded data indicative of an identity of the map and of a plurality of reference points of the map, the map of the geographic area and the coded data being printed substantially simultaneously;

receiving, in the computer system, indicating data from a sensing device operated by the user, the indicating data regarding the identity of the map and a position of the sensing device relative to the map, the sensing device, when placed in an operative position relative to the map, generating the indicating data based at least partially on sensing ~~sensing the indicating data using~~ at least some of the coded data in the vicinity of the position; and

identifying, in the computer system and from the indicating data, the at least one geographic location.

2. A method according to claim 1 including the further steps of:

receiving, in the computer system, movement data regarding movement of the sensing device relative to the map, the sensing device sensing its movement relative to the map using at least some of the coded data; and

identifying, in the computer system and from the movement data, a geographic region.

3. A method according to claim 1 wherein the map contains at least one of the following categories of map information:

(a) geographic features of the geographic area;

(b) cities in the geographic area;

(c) countries related to the geographic area;

(d) different views of the geographic area;

(e) topography of the geographic area;

(f) vegetation of the geographic area;

(g) average rainfall for the geographic area;

(h) seasonal temperatures for the geographic area; and

(i) population for the geographical area.

4. A method according to claim 1 or claim 2 including the further step of printing at least one map control, and, when the map control is designated by the user using the sensing device, performing, in the computer system, an action associated with the map control.

5. A method according to claim 4 wherein the action is one of:

(a) printing information about a designated country, region, city or other geographic location or geographic area;

(b) printing a map of a designated geographic region;

(c) printing a distance between designated geographic locations;

(d) printing a map of a geographic area adjoining a particular geographic area; and

(f) printing a scaled-up or scaled-down map of a particular geographic area.

6. A system for enabling a user to designate, in a computer system, at least one geographic location, the system including:

a map of a geographic area, the geographic area including the at least one geographic location, the map including coded data indicative of an identity of the map and of a plurality of reference points of the map;

a printer for printing the map, including the coded data, on demand, the printer

being adapted to print the map and the coded data substantially simultaneously; and

a computer system for receiving indicating data from a sensing device operated by the user, the indicating data regarding the identity of the map and a position of the sensing device relative to the map, the sensing device, when placed in an operative position relative to the map, generating the indicating data based at least partially on sensing ~~sensing the indicating data using~~ at least some of the coded data in the vicinity of the position;

wherein the computer system is configured to identify, from the indicating data, the at least one geographic location.

7. A system according to claim 6 including the sensing device, the sensing device sensing its movement relative to the map using at least some of the coded data; wherein the computer system is configured to identify, from said movement, a geographic region.

8. A system according to claim 7 wherein the map contains at least one of the following categories of map information:

(a) geographic features of the geographic area;

(b) cities in the geographic area;

(c) countries related to the geographic area;

(d) different views of the geographic area;

(e) topography of the geographic area;

(f) vegetation of the geographic area;

(g) average rainfall for the geographic area;

(h) seasonal temperatures for the geographic area; and

(i) population for the geographical area.

9. A system according to claim 6 or claim 7 further including a map control page

including at least one printed map control; wherein the computer system is configured to perform an action associated with the map control when the map control is designated by the user using the sensing device.

10. A system according to claim 9 wherein the action is one of:

(a) printing information about a designated country, region, city or other geographic location or geographic area;

(b) printing a map of a designated geographic area;

(c) printing a distance between designated geographic locations;

(d) printing a map of a geographic area adjoining a particular geographic area; and

(f) printing a scaled-up or scaled-down map of a particular geographic area.

11. A system for enabling a user to designate, in a computer system, at least one geographic location, the system including:

a globe, the globe ~~including~~ comprising a non-electronic printed surface displaying coded data indicative of a plurality of reference points of the globe;

a computer system for receiving indicating data from a sensing device operated by the user, the indicating data regarding a position of the sensing device relative to the surface of the globe, the sensing device, when placed in an operative position relative to the surface of the globe, generating the indicating data based at least partially on sensing ~~sensing the indicating data using~~ at least some of the coded data in the vicinity of the position;

wherein the computer system is configured to identify, from the indicating data, the at least one geographic location.

12. A system according to claim 11 including the sensing device, the sensing device sensing its movement relative to the globe using at least some of the coded data; wherein the computer system is configured to identify, from said movement, a geographic region.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

ABSTRACT

~~The present invention provides a~~A method of navigating interactive printed maps and globes. The method ~~enables~~enabling a user to designate, in a computer system, ~~at least one~~a geographic location, ~~the~~ and~~method~~ includes a number of steps. ~~ing t~~The first ~~steps~~ step involves~~of~~ printing a map of a geographic area, the geographic area including the ~~at least one~~ geographic location, and the map including coded data indicative of an identity of the map and of a ~~plurality~~ number of reference points of the map. The next step involves; receiving, in the computer system, indicating data from a sensing device operated by the user, . The indicating data ~~regarding~~ includes the identity of the map and a position of the sensing device relative to the map. T, ~~the~~ sensing device, when placed in an operative position relative to the map, generating the indicating data based on sensing ~~sensing the indicating data using at least~~ some of the coded data. The next step involves; ~~and~~ identifying, in the computer system and from the indicating data, the ~~at least one~~ geographic location.

~~(Figure 8)~~

Anoto Technology

The Anoto Technology is a combination of an ingenious pattern, advanced image processing, Bluetooth™ wireless communication and an information infrastructure. These features let you use pen and paper together with all the possibilities of information technology.

Bluetooth Transceiver

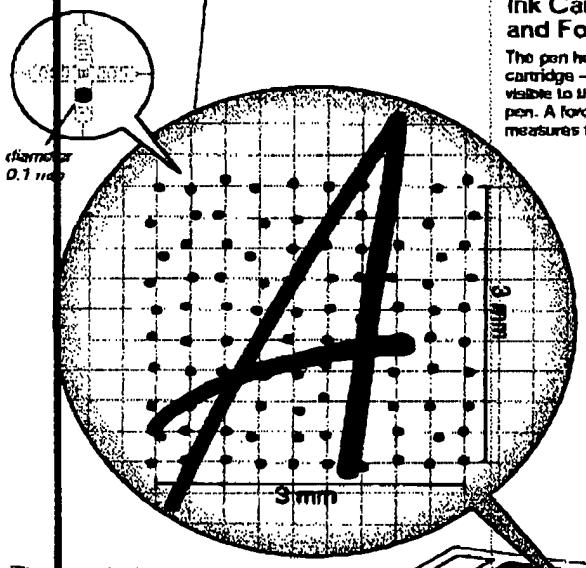
The Bluetooth wireless technology is a *de facto* standard that enables all things that are now connected by cable to be connected without cables.

Battery

A rechargeable battery enables a full day of use.

The pattern

The pattern consists of small dots slightly dislocated from a strict grid arrangement. A very small part of the pattern, 2x2 mm, gives the exact location in the full pattern.



Ink Cartridge and Force Sensor

The pen holds an ordinary ink cartridge – all that is written is visible to the eye just like a normal pen. A force-sensing resistor measures the stylus tip force.

Memory

The pen contains enough memory to locally store several pages of writing.

Processor

A dedicated image processor calculates the positions in the full pattern space in real time.

Camera

The pattern is illuminated by infrared light and a digital camera, i.e. CMOS sensor, aquires images of the pattern at 100 frames per second. The ink from the pen is not visible to the camera. In this way the pattern is not destroyed by writing on it.

The user paper

The pattern appears as a faint grey shade on the paper and enables seamless integration with the digital domain of Anoto and further.

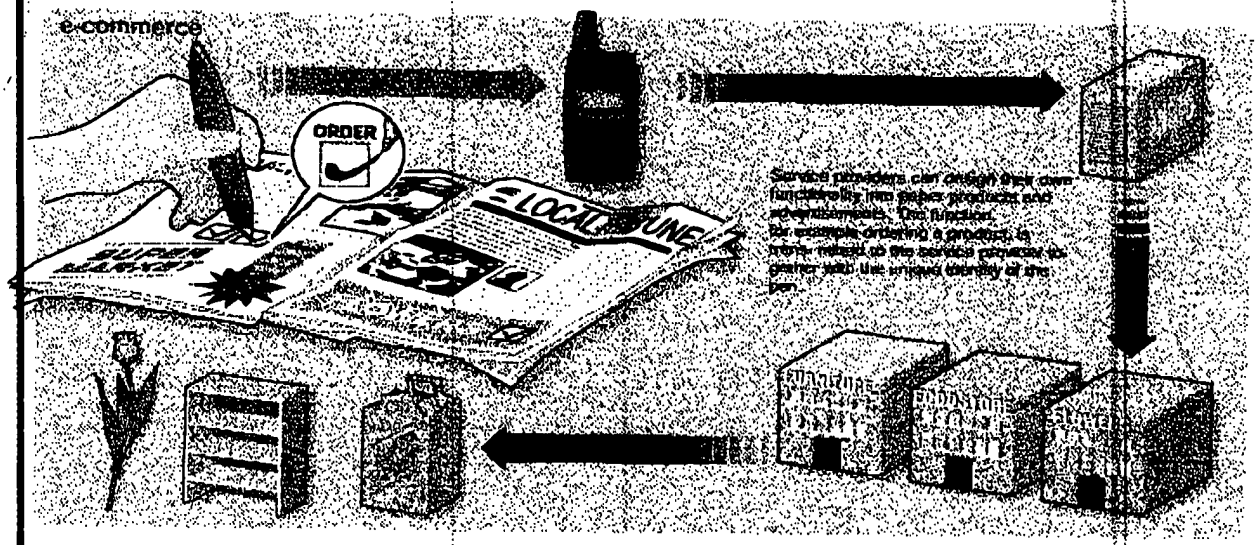
The predefined area

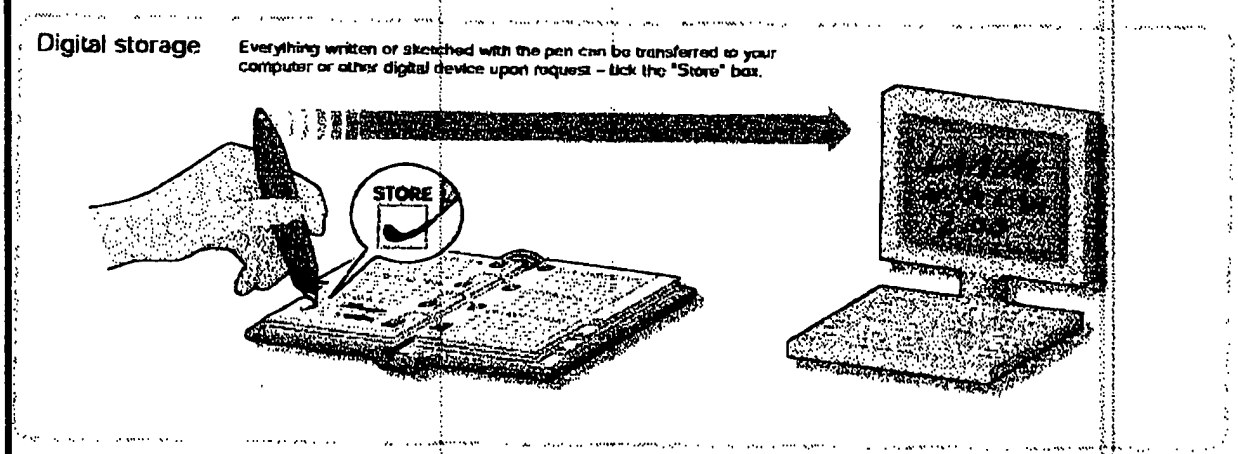
Different parts of the full pattern space can be dedicated to different applications such as time managers, note pads, e-commerce etc. Certain parts of the space define functions such as store and send.

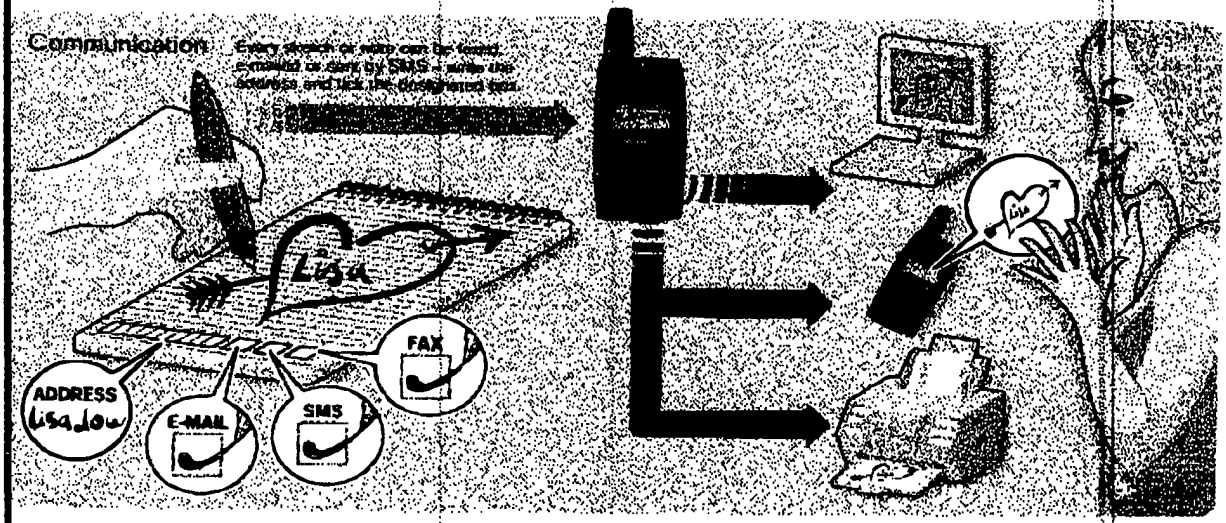
The full pattern

Every 2x2 millimeter of the pattern gives the exact location, down to 1/30 of a millimeter, in the full pattern that has the size of 73 000 000 000 000 A4 pages – equivalent to half the size of the USA.

Applications







These sheets are produced by publishers, who buy apparently blank sheets of Intelligent Paper from an authorized producer. The publishers can mark them with conventional visible inks in any way they choose.[1] For each sheet of Intelligent Paper, the infrastructure provided by the Intelligent Paper producer will ensure that, when the end-user clicks the pointer, the <*page-id, pointer-loc*> pair is routed to the publisher, who is then responsible for associating whatever actions he chooses with this pair. These actions depend on the internal representation — called the digital page — of the physical page, stored at the publisher's site. This digital-page contains descriptions of actions to be associated with certain areas on the physical page. It may also contain a full digital counterpart of the visible marks on the physical page. *In this way, the physical page behaves as a "window" displaying the visual content of its digital counterpart, and the pointer behaves as a "mouse" moving over this window, activating links, selecting content and performing actions.* The only difference between this and the standard computer screen and mouse is that the physical page cannot modify its display state.

There is currently a profusion of proposals for linking paper documents to the electronic world:

Over-desk video Some researchers have proposed mounting a video-camera above the user's desk and monitoring the user's gestures when he points or writes on paper documents ("digital desk") [15, 24, 19];

Memory notes Others have discussed ways in which written annotations on paper can be made during an audio or video recording and later used as fast indexes into the recording [23] (see also [14] for a related approach);

Embedded data Products have been released which permit the embedding of digital data in printed documents (SmartPaper™[12]);[2]

Marking active paper areas The PaperLink project [3] augments paper documents with electronic features by permitting the user to make marks on paper using a highlighter pen equipped with a camera: when the user later uses the pen to pick up these regions, pattern-recognition techniques allow the system to execute commands associated with these marks.

Dynamic paper Physical and chemical extensions of paper-like supports aim to make paper capable of changing its state in time, either for displaying new information [22, 11], or for recording data which can be recovered by reading devices [25, 2].

Intelligent Paper is distinguished among the approaches to connecting the paper world to the digital world by the view it takes on two points:

[1] There may be some constraints on the types of inks used, see section 3. Also, the publishers may have the capabilities of producing the invisible substrate themselves.

[2] SmartPaper uses DataGlyphs, as Intelligent Paper does, but in a quite different way. It is based on full-page scanning. There is no notion of the position of a pointer, nor is there a notion of a generic encoding substrate (Intelligent Paper's encoding of *page-id* and *pointer-loc*). Mostly, data are encoded directly into the paper, rather than being *addressed* through double indirection (see section 3).